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NFPA 664-1998 CHANGES

NFPA revised the *Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*. The standard was released 15 September 1998.

The major change affecting Navy operations is the removal of the exception for wood shops incidental to the principal occupancy. The new standard "... shall apply to dust producing operations that occupy areas of more than 2,000 ft² or to areas where dust producing equipment requires an aggregate dust collection flow rate of more than 1500 ft³/min." Even a well designed shop with as few as three or four pieces of equipment can exceed the 1500 ft³/min flow rate.

Specific sections of interest to industrial ventilation designers are:

8-2.2. Dust collectors shall be located outside the buildings. (See Note 1)

8-2.3. All cutting, shaping, planing, sanding or other machines that produce finely divided wood dust or shavings shall be provided with a dust pickup, dust conveying and a dust collecting system.

8-2.5.1. Every branch duct and every section of the main duct shall be sized for not less than the minimum air velocity and air volume required to transport the wood dust or shavings through the ducting and into the collecting equipment.

8-5.2.2. The capacity of the system shall be calculated on the basis of all hoods and other openings connected to the system being open. (See Note 2)

8-5.2.3. Dampers, gates, or orifice plates provided for the specific purpose of balancing the airflow in the system shall be fastened to prevent inadvertent manipulation. (See Note 3)

Notes:

1. There are two exceptions relating to the location of the collector, duct configuration, and explosion suppressions sys-

- tems. See the standard for the exceptions.
2. Volume flow rate or capacity calculations must include all hoods, sweeps, etc.
 3. Dampers are only used for system balancing and must be locked in place after balancing. The operator shouldn't open and close the dampers on a day-to-day basis.

The requirement in Section 8-5.2.2 for fully open ductwork is not new to NFPA 664, 1998 version. In the past, many designers invoked the "incidental use" exception to save energy and initial costs by sizing smaller fans. Sometimes designers specified the fan capacity based on 40 to 60% of the calculated volumetric flow rate of the combined hoods. The percentage was based on the typical number of workers in the shop or the equipment with the highest flow requirements. Most Navy shops will no longer be exempt under the incidental use exception. Refer to ESC425's web page at <http://www.nfesc.navy.mil/enviro/esc425/WoodShop.htm> to read about a case study of a fire in a ventilation system designed with dampers.

ESC 425 agrees with the elimination of the exception in the standard and recommends designing the fan based on 100% of the total recommended volumetric flow rate. If you have an existing ventilation system designed for partially closed operations, inspect the ductwork on a routine basis. Pay attention to dust accumulation locations including inside the main and around dampers, elbows, and branch fittings. Start with daily inspections and reevaluate the inspection cycle to reduce the frequency as needed. Refer to ESC425's web page <http://www.nfesc.navy.mil/enviro/esc425/ib110.htm> for a wood shop system testing protocol.

The NFPA standard further includes requirements for the fan, collection system, ducting materials and fire and explosion protection requirements. Copies of the full standard are available from the National Fire Protection Association. You can purchase the individual standard at the member price of \$17.50, if you are part of the Naval Facilities Engineering Command (NAVFAC) community since NAVFAC is an institutional member. The fee for non-

members is \$19.50. If you frequently refer to several NFPA standards, consider purchasing a subscription for the complete set of standards. To view the NFPA web page, go to <http://www.nfpa.org/> and select the online catalogue. Otherwise, contact NFPA, 1 Batterymarch Park, Quincy, MA 02269-9101 USA, telephone (617) 770-3000/Fax (617) 770-0700.

Contact the IAM via e-mail at iam@nfesc.navy.mil for more information on the NFPA standard and on designing and testing industrial ventilation systems for wood shops.

LEAD EXPOSURE ASSESSMENTS

Whenever construction, repair, painting, or decorating involves the presence of lead (any detectable level), the employer must determine initially if employees may be exposed to lead at or above the action level (AL)(30ug/m³). An exposure assessment determines the employee exposure, which would occur if the employee were not wearing a respirator. The employer must collect personal samples representative of a full shift, including one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level. Employees may use previous exposure monitoring results obtained within the 12 months for work operations conducted under workplace condition closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations.

If no employee is exposed to airborne contamination of lead at or above the action level, the employer shall make a written record of such determination including date, location within work site, and name and social security number of each employee monitored--then no further monitoring is required. However, handwashing facilities, hazard communication training, and recordkeeping are required. When an employee requests for a respirator, the employer must provide the respirator and medical

surveillance at no cost to the employee.

If the initial determination reveals employees' exposure to be at or above the AL but below the permissible exposure limit (PEL) 50 ug/m³, monitoring is required every six months. In addition, control methods, handwashing facilities, employee information and training, recordkeeping, and medical surveillance are required. Refer to [29 CFR 1926.62](#) for details.

If initial determination reveals employee exposure to be above the PEL, monitoring is required every three months and a compliance plan, methods of compliance, respiratory protection, housekeeping, hygiene facilities and practices, medical surveillance, employee information and training, signs and recordkeeping are required ([29 CFR 1926.62](#))

IAM CONNECTION

IAM. What are the ventilation requirements/guidelines for a fiberglass insulation shop where workers cut fiberglass foam and fabric? The shop has one downdraft (grated top, not perforated plate) table, two ventilated sewing machines, one ventilated band saw, and one welding-bench style hood. What information do you have for fiberglass operations? The latest American Conference of Governmental Industrial hygienists (ACGIH) Industrial Ventilation, A Manual of Recommended Practice (IV Manual) that we have here is the (green) 22nd edition. Is this the latest version? Naval Medical Center, San Diego.

Reply. While there is no specific guidance in the current version of the ACGIH IV Manual, 23rd Edition, directly addressing fiberglass lay-up, grinding and spray-up operations, you are encouraged to adapt any of the hood designs to fit your needs. For instance, any of the painting or welding benches could be adapted to capture adhesive vapors generated during spray-up and lay-up operations. The hoods will not be capable of collecting the particu-

late generated during fiberglass grinding. Therefore, consider using ventilated tools for the grinding operations.

A common misconception about the ACGIH IV Manual is that hoods shown in Chapter 10, Specific Operations, are only for use in the application shown in the manual. The ACGIH IV Committee recognizes that misconception. The Chapter 10 introduction will encourage the reader to adapt the existing drawings to their application.

Another resource is the design guidelines we wrote for fiberglass lay-up hoods in MIL-HDBK 1003/17C, Chapter 6 dated 29 February 1996. If you do not have the military handbook, go to the Department of Defense Single Stock Point (DODSSP) web page at <http://assist.daps.mil/online/> to request a copy through The Acquisition Streamlining and Standardization Information System (ASSIST) option. You can also download a copy from the NAVFAC Criteria Office at http://www.efdlant.navy.mil/Lantops_15/.

We are revising the military handbook and expect to release it in early FY00. NAVFAC policy now requires us to use consensus standards whenever possible, so there will be significant changes to the MIL-HDBK. We will rely heavily on the ACGIH IV Manual, ANSI Standards, and NFPA Codes.

IAM. We are having a problem with metal dust landing on cars that are parked near the abrasive blasting facility. The workers replaced all the filters and seated them properly after discovering that some were distorted. Is there an easy way to test if particulates are coming out of the exhaust duct? Naval Medical Center, San Diego.

Reply. Refitting the filters should help correct the metal dust emission problem. If refitting does not correct the problem, look for holes in any of the pleated filters. When there are gaps from holes or incorrectly aligned filters, the unfiltered air quickly "finds" the path of least resistance and bypasses the filtration. Hopefully, that is what happened in this case. If you start seeing grit again and all the

filters are seated properly, then, we can look for other problems. Consider installing a magnehelic gauge to evaluate differential pressure before and after the bag house. Mark the operating range, so workers can request service when the gauge moves out of range. Recommend a weekly (or daily, if appropriate) bag house inspection with gauge readings that is kept in a record book near the operation.

You should also check the filter's efficiency and air-to-cloth ratio specifications. If they are inappropriate for the operation, the excessive pressure build-up could create holes in the filters or dislodge filters from their housing.

A very simple test is to paint a 2" diameter stick white and coat it with sticky material like silicon or glue. Stick it in a hole in the stack for a minute and pull it out. If you can reach the top of the stack, just lay the stick across the outlet so you don't have to drill another hole in the stack. If the white stick is coated with metallic dust, you have a problem.

You can purchase more sophisticated equipment, like the fluorescent scopes, but check with your environmental department. They may have some fluorescent dye equipment that will do the job. One of our engineers mentioned that you get a better view of the leaks if you test on a dark night.

We invite readers to share their experiences with fluorescent dye testing for this application. Respond using the iam@nfesc.navy.mil. We will evaluate the answers and publish relevant comments.

LABORATORY ACCREDITATION REQUIREMENTS

We have received several questions regarding laboratory accreditation requirements for analyzing asbestos bulk and air samples. For clarification, the following regulatory excerpts are included:

Bulk Analysis

[29 CFR 1926.1101\(k\)\(5\)\(ii\)\(B\)](#) (Mandatory). Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in [40 CFR 763.86](#). The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a CIH. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the round robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally-recognized round robin testing program.

[29 CFR 1926.1101 App A](#) (Mandatory) paragraph 2.b. under *Quality Control Procedures*. All laboratories should also participate in a national sample testing scheme such as the Proficiency Analytical Testing Program (PAT), or the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).

[40 CFR 763.87](#) Analysis (Non-Mandatory) (Mandatory for AHERA applications). Local education agencies shall have bulk samples, collected under 763.86 and submitted for analysis, analyzed for asbestos using laboratories accredited by the National Bureau of Standards (NBS). Local education agencies shall use laboratories, which have received interim accreditation for polarized light microscopy (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program until the NBS PLM laboratory accreditation program is operational.

Air Sample Analysis

[29 CFR 1926.1101 App A](#) (Mandatory) paragraph 2.b. under *Quality Control Procedures*. All laboratories should also participate in a national sample

testing scheme such as the Proficiency Analytical Testing Program (PAT), or the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).

[29 CFR 1926.1101 App A](#) (Mandatory) paragraph 3 under *Quality Control Procedures*. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.

[40 CFR 763.90](#) Analysis (Non-Mandatory) (Mandatory for AHERA applications) (2)(ii). Local education agencies shall have air samples collected under this section analyzed for asbestos using laboratories accredited by the National Bureau of Standards to conduct such analysis using transmission electron microscopy (TEM) or, under circumstances permitted in this section, laboratories enrolled in the American Hygiene Association Proficiency Analytical Testing Program for Phase Contrast Microscopy (PCM).

OSHA PROPOSES EXPANDED STANDARD FOR SILICA

The Occupational Safety and Health Administration (OSHA) is considering expanding its standard for silica. If the expansion goes through, the standard will be similar to the lead or asbestos standards, which have specific requirements for hazard control and medical surveillance. The proposal is expected to be out by mid-2000.

The Navy conducts foundry and abrasive blast operations, which will be effected by an expanded silica standard. Other operations that produce crystalline silica are road making, and semiconductor production.

It is important to know what type of silica an opera-

tion is producing. A health and safety professional has to determine if it's producing amorphous or crystalline silica. Crystalline silica is the most hazardous because long term exposure can cause silicosis, pulmonary fibrosis and an increase risk of contracting tuberculosis. Within the category of crystalline silica, there is quartz, cristobalite, tridymite, and tripoli. Categories of amorphous silica are diatomaceous earth, precipitated silica, silica fume, fused silica and silica gel.

OSHA has issued permissible exposure limits (PEL) for the various forms of both amorphous silica and crystalline silica. The PELs are calculated using the formulas outlined in [29 CFR 1910.1000, Table Z-3](#). The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended threshold limit value (TLV) for different forms of silica. The TLVs for the crystalline forms that cause silicosis are 0.05 mg/m³ for cristobalite, 0.1 mg/m³ for quartz, and 0.05mg/m³ for tridymite. Other TLVs have been published for the other forms of silica.

The best way to eliminate a hazard from silica is substitution. For example, if you have an abrasive blast operation, use an abrasive that is free of crystalline silica. If it is not feasible to substitute products, then a mechanical ventilation system should be used. Wet methods can be used in some operations such as road construction or drilling. During an abrasive blast operation the operator must wear an abrasive hood with supplied air. Other operations will require respiratory protection if the PEL is exceeded and substitution, engineering and administrative controls cannot reduce exposure below the PEL.

For more information please contact the IAM via e-mail at iam@nfesc.navy.mil.

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